10. Distortion Effects

Objectives

- Identify **parameters on a distortion** effect
- Discuss **how distortion occurs**
- Give examples of the use of **fuzz and overdrive**
- Identify the difference between **soft and hard clipping**

Skills Development

- Physics and Numeracy

Key Words

Pedal
Gain
Tone
Output
Clipping
Hard Clipping
Soft Clipping
Valve Amp
Transistor Amp
Fuzz
Overdrive
Harmonics
Threshold

10. Distortion Effects

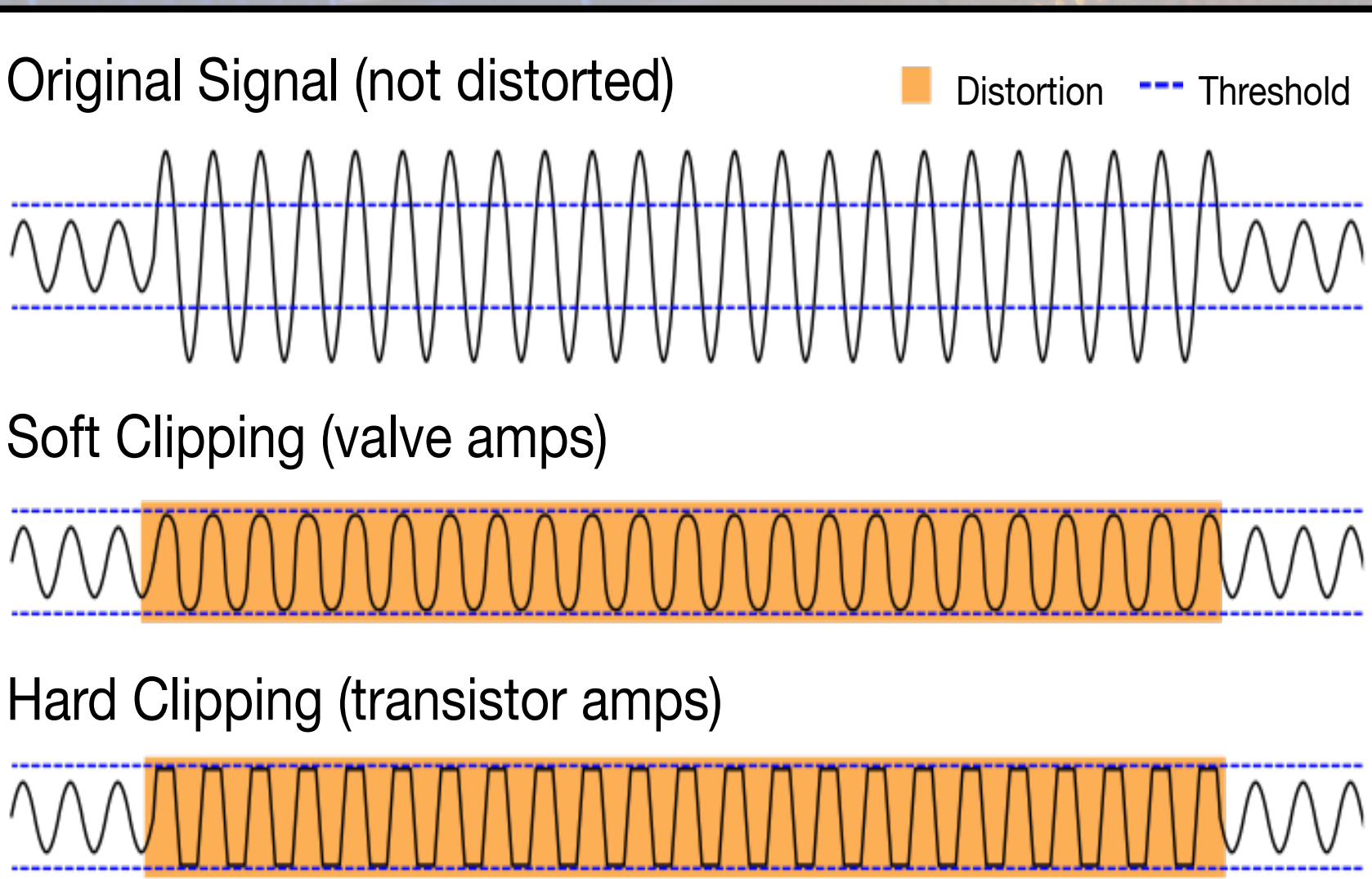
- **Distortion** is created by turning the volume of a sound up too loud.
- It is primarily a **guitar effect**, created using a pedal or stompbox, or a DAW plugin
- We can control **three parameters** of distortion:

Gain	The volume of the input signal (before distortion)
Output	The volume of the output signal (after distortion)
Tone	Changes the frequency content of the output

Creating Distortion

- Historically, artists created distortion by **damaging their amplifiers**
- When the **gain is increased**, the wave **peaks and troughs are clipped**

10. Distortion Effects



Hard and Soft Clipping

- **Soft clipping** rounds the tops of the waves and sounds warmer. It is often seen in **valve amps**.
- **Hard clipping** creates a wave with square peaks & troughs and sounds harsher; it is commonly seen in **transistor amps**.
- The distorted signal has **more harmonics**, and filtering / EQ may be required to **fit it well into the mix.**

10. Distortion Effects

Types of Distortion

- Fuzz is a **dense distortion** used by guitarists such as Jimi Hendrix
- Overdrive gives the sound more **crunch.** It was originally created by **pushing amps to play louder** than they **were able to.**
- Bit distortion is created by lowering the **bit depth** and leads to **distortion of audio, making** the track sound **‘electronic’** or **‘lo-fi’**

Modelling Distortion

- We can use plugins to **model the sound of distortion**
- Software plugins include Logic's **'Overdrive'** and **'Bitcrusher'**
- We can also use hardware to emulate the sound of **different distortions and amplifiers**
- Line6's **Pod** emulates the sound of many different guitar rigs
- This is beneficial as it means that you can have the option of **lots of different amplifier settings** without **needing to own or transport** the physical amplifiers